

in the morning. **30th.**—A thunder-storm, with heavy rain, began at Indianapolis, Ind., about noon. A church was struck by lightning and damaged to the extent of about \$500. A destructive storm was reported in the south part of Claiborne

Co., La., in the evening. **31st.**—Owing to darkness and heavy rain the steamer "City of Detroit," from Detroit to Cleveland, ran on a rock at the "Lime Kilns" and sunk. No lives were lost.

INLAND NAVIGATION.

FLOODS.

The month opened with high water in the Mississippi River from Cairo, Ill., southward, and high water prevailed in many of the tributaries of the lower Mississippi. On the 1st the stage of the Ohio River at Cincinnati, Ohio, was 50.3 feet, 5.3 feet above the danger-line, and the stage of the water at Louisville, Ky., was 30.4 feet, 6.4 feet above the danger-line. On the 4th the Mississippi River reached 46.2 feet at Cairo, Ill., at which point it remained almost stationary until after the 6th. At Yuma, Ariz., the east bound passenger train which arrived on the morning of February 22d returned to California, offering the first opportunity to forward mail since February 21st. On the 4th the levee on the Sacramento River opposite Sacramento, Cal., broke at 12.30 p. m., partially flooding the town of Washington. The gauge reading was 26.7 feet. On the 5th the river rose to 26.9 feet and a levee about 3 miles below Sacramento, on the Yolo county side, gave way. The break was only a short distance below the great break of December, 1889, and the stage of the water was only 1 inch lower than at that time. On the 5th and 6th the Tennessee River was rising at Chattanooga, Tenn. On the 7th the river was falling at Cairo, Ill. At Chattanooga, Tenn., the Tennessee River continued to rise.

On the 8th the river continued to rise at Chattanooga, Tenn.; the backwater was encroaching on the lowlands in south Chattanooga, and the residents were moving to higher ground. On the 9th the river continued to rise at Chattanooga, Tenn. buildings along the river front and in the lowlands were flooded and railroad trains were abandoned. At 8 a. m. the Savannah River stood at 31.2 feet at Augusta, Ga. The west and south edges of the city were completely inundated; street cars were compelled to stop running, and towards night a general cessation of business was caused by the rapidly encroaching water. River and streams were generally high in Georgia. High water was generally reported in streams in Alabama and Mississippi. At Nashville, Tenn., the Cumberland River was rising and much damage was caused to property in low-lying sections. At Lynchburgh, Va., the James River was very high. On the 10th, at 2 p. m., the Cumberland River was 47.8 feet at Nashville, Tenn., and stationary. Streets in the lower part of the city were flooded and considerable damage was caused. On the 10th the Savannah River reached 35.5 feet at Augusta, Ga., after which it fell slowly. At Chattanooga, Tenn., the Tennessee River rose slowly; trains on the mountain railroads were stopped by high water, and the Belt Road trains ran through 2 inches of water near the National Cemetery. The first break in the lower Mississippi levees occurred at Vidalia, La., opposite Natchez, Miss.; 450 yards of the levee caved in; no damage done. The Mississippi River reached 34.9 feet at Memphis, Tenn., 1.9 foot above the danger line. On the 11th the Tennessee River reached 38.9 feet, 5.9 feet above the danger-line, at Chattanooga, Tenn., and then began to fall. A crevasse occurred at night in the levee at Hill House, near Sunflower Landing, Coahoma Co., Miss. At Nashville, Tenn., the Cumberland River was 47.9 feet and stationary. On the 14th the Cumberland River reached 49.3 feet, 9.3 feet above the danger-line, at Nashville, Tenn. At New Orleans, La., the water washed over the bank at noon, but the break was quickly repaired and no damage resulted.

On the 16th an overflow occurred at the foot of Girard street, New Orleans, La., but a protection levee was immediately put up, forcing the water back in the river. A break in the Bayou La Fourche levee was reported in the morning. On the 17th

the first serious break in the levees near New Orleans, La., occurred on the Ames Plantation, nearly opposite Audubon Park, in the upper end of the city. The break was nearly 100 feet wide and 15 feet deep. Algiers and Gretna, 2 small villages near the crevasse, and a number of small farms were threatened with overflow. The river reached 16.4 feet, 3.4 feet above the danger-line, at New Orleans, La. On the 18th the Ames crevasse widened rapidly, and the water covered the tracks of the South Pacific and Texas Pacific Railroads, seriously interfering with traffic on those lines. The stage of the river continued at 16.4 feet. On the 19th the Ames crevasse continued to widen. On the 20th the Ames crevasse continued to widen, but as a protection levee had been constructed it was thought that no damage would be done at Gretna and Algiers. On the 21st the back levee at Concordia, East Carroll Parish, La., broke in the morning and widened rapidly. On the 22-23d serious freshets were reported in rivers and streams in Maine and New Hampshire. On the 23d the Ames crevasse at New Orleans was about 600 feet wide. The break at Concordia was 600 feet wide. On the 24-25th the Little Colorado River was very high at Holbrook, Ariz., and the span of telegraph line crossing the river was washed away. On the 27th the flood at Holbrook, Ariz., had abated. On the 31st the river was 42.2 feet and rising at Cairo, Ill. At Vicksburg, Miss., it reached 48.0 feet, 7.0 feet above the danger-line, and at New Orleans, La., the river was falling slowly.

ICE IN RIVERS AND HARBORS AND OPENING OF NAVIGATION.

Penobscot River.—On the 21st a heavy ice gorge was reported at Veazie, Me.

Lake Champlain.—The lake was frozen at Burlington, Vt., on the 5th.

Susquehanna River.—At Lock Haven, Pa., the river was partly frozen on the 1st; floating ice, 2d; partly frozen, 3d; river clear of ice, 10th. At Wilkes Barre floating ice was reported from the 1st to 3d.

Hudson River.—The first boat of the season arrived at Albany from New York City on the 25th.

The Morris Canal was open for navigation on the 30th.

Detroit River.—Considerable ice in the river on the 1st; floating ice, 3d; river clear of ice, 5th; floating ice, 10th. The first trip of the season was made on the 12th by the steamer "City of Detroit," running between Detroit and Cleveland. On the 25th navigation was opened on the Detroit River as far north as Lake Saint Clair Flats, at which point an ice gorge had formed.

Mississippi River.—Floating ice at Alton, Ill., 1st to 15th. At Davenport, Iowa, the ice went out of the river on the 10th. On the 18th the ferry boat began making regular trips. Navigation opened on the 25th. On the 27th the river was reported free from ice between Winona, Minn., and La Crosse, Wis. On the 29th the ice was breaking up at Red Wing, Minn. On the 30th the river was clear of ice at Saint Paul, Minn.

Missouri River.—Floating ice at Herrmann, Mo., 3d to 6th, and 9th. At Saint Joseph's Bridge, Mo., ice was running in the river, 1st and 2d; river blocked by ice, 3d; ice broke up 16th; running ice, 17th; river clear of ice, 18th. On the 4th the pontoon bridge across the river at Saint Charles, Mo., was swept away by flood and heavy ice. On the 26th ice was running in open places at Fort Sully, S. Dak., and on the 31st the river was rising and the water running over the ice. On the 28th the water was running over the ice at Fort Buford, N. Dak. On the 29th the Yellowstone River opened, causing the ice in the Missouri River at Fort Buford, N. Dak., to break,

and the ice ran out freely for a few hours, after which it stopped moving. During the 30th-31st the ice gorge continued at Fort Buford. On the 31st navigation opened at Sioux City, Iowa.

Lake Erie.—On the 4th the ice on the lake and in the river was broken up by a severe gale; 10th, ice considerably broken by a gale; 15th, ice badly broken by a gale and drifting down the river in large fields; 23d, ice drifting down the river in large fields. On the 5th the inner harbor at Cleveland, Ohio, was full of ice from 4 to 6 inches thick, and outside of the breakwater ice 6 to 10 inches thick extended as far as could be seen; this ice was driven in by a ne. wind. On the 10th nearly all the ice was driven out of the harbor by s. wind. On the 12th the first steamer of the season arrived from Detroit and returned on the 15th, being the first departure of the season. On the 24th the lake was covered with pack ice as far as could be seen. On the 29th no ice was visible.

Lake Huron.—On the 23d the south end of the lake was covered with floating ice and the Saint Clair River was full of floating ice. The night of the 24th communication by boat with points south of Marine City was closed, and on the 25th navigation was entirely closed on the Saint Clair River. On the 30th the ice jam in the Saint Clair River at Marine City gave way and navigation between local points resumed. On the 31st the lake was covered with floating ice at Port Huron and there was no marked indication of a resumption of navigation. At Alpena, Mich., the river and bay were clear of ice on the 28th. A schooner which left for Sand Beach on that date was obliged to return on account of ice in Thunder Bay.

Lake Michigan.—On the 3d 5 steamers were fast in the ice at Milwaukee, Wis.; 5th, ice drifted into harbor and the harbor was blocked by ice at night; 6th, the wind piled the ice on shore; 9th, harbor free of ice. On the 29th 2 boats, the first

of the season, arrived at Manistee, Mich., and the channel was free of ice at Green Bay, Wis.

Heights of rivers above low-water mark, March, 1891 (in feet and tenths).

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Red River.</i>						
Shreveport, La.	29-9	1	21-2	30	15-9	5-3
<i>Arkansas River.</i>						
Fort Smith, Ark.	22-0	31	12-9	23	3-8	9-1
Little Rock, Ark.	23-0	1, 10	12-7	28	8-5	4-2
<i>Missouri River.</i>						
Fort Buford, N. Dak.	21-0	27	12-2	2	4-0	8-2
<i>Kansas City, Mo.</i>						
<i>Mississippi River.</i>						
Saint Paul, Minn.	14-0					
La Crosse, Wis.	13-0					
Dubuque, Iowa *.	16-0					
Davenport, Iowa †.	15-0	25	7-1	12	2-3	4-8
Keokuk, Iowa.	14-0	28	11-0	16	1-8	9-2
Saint Louis, Mo.	30-0	30, 31	19-3	15, 16	6-8	12-5
Cairo, Ill.	40-0	4, 5, 6	46-2	30	41-9	4-3
Memphis, Tenn.	33-0	10	34-9	1	33-0	1-9
Vicksburg, Miss.	41-0	31	48-0	1	43-5	4-5
New Orleans, La.	13-0	17, 18	16-4	1	14-7	1-7
<i>Ohio River.</i>						
Pittsburgh, Pa.	22-0	14	13-8	7, 8	6-1	7-7
Parkersburg, W. Va.	38-0	16	21-9	7	10-4	11-5
Cincinnati, Ohio.	45-0	1	50-3	24	32-2	18-1
Louisville, Ky.	24-0	1	30-4	25, 26	12-1	18-3
<i>Chamberland River.</i>						
Nashville, Tenn.	46-0	14	49-3	25	12-5	36-8
<i>Tennessee River.</i>						
Chattanooga, Tenn.	33-0	11	38-9	26	10-4	28-5
Knoxville, Tenn.	29-0	10	16-9	26	5-0	11-9
<i>Monongahela River.</i>						
Pittsburgh, Pa.	29-0	14	13-8	7, 8	6-1	7-7
<i>Savannah River.</i>						
Augusta, Ga.	32-0	10	35-5	4, 5	11-8	23-7
<i>Willamette River.</i>						
Portland, Oregon.	15-0	28	6-0	8	1-9	4-1

* Frozen.

† For 21 days.

ATMOSPHERIC ELECTRICITY.

AURORAS.

Auroras were reported as follow: 3d, Clinton and Marshalltown, Iowa; Eastport, Me.; Fort Buford, N. Dak.; Kimball and Webster, S. Dak.; Medford, Wis. 4th, Clinton, Iowa. 5th, Ship Island, Miss. 6th, Clinton and Webster City, Iowa; Eastport, Me. 11th, Montevideo, Minn. 12th, Alta, Iowa; Caldwell, Mich.; Morris, Minn.; Webster, S. Dak. 13th, Saint Paul, Minn.; Ithaca, N. Y. 14th, Eastport, Me.; Cambridge and Fall River, Mass.; University, Miss. (first ever observed); Wedgewood, N. Y. 15th, Eastport, Me. 16th, Bar Harbor, Me.; Eagle's Mere, Pa. 17th, Alta, Iowa; Orono, Me. 18th, Webster City, Iowa. 26th, Coopersburgh, Pa. 28th, Amherst, Mass. 29th, New Hartford, Conn.; Moorestown, N. J. 30th, New Hartford, Southington, and Voluntown, Conn.; Sandwich, Ill.; Cornish and Orono, Me.; Amherst, Blue Hill Observatory, Cambridge, Concord, Fall River, Newburyport, North Billerica, and Royalston, Mass.; Berlin Mills, Groveton, Nashua, and Plymouth, N. H.; Moorestown, N. J.; Lowville and Wedgewood, N. Y.; Dyberry and Eagle's Mere, Pa.; East Berkshire and Northfield, Vt. 31st, Alta, Iowa; Eastport and Orono, Me.; Plymouth, N. H.; Kimball, S. Dak.; Northfield, Vt.

THUNDER-STORMS.

Thunder-storms were reported as follows: east of the Rocky Mountains thunder-storms were reported in the greatest number of states, 16, on the 7th; in 15 on the 30th; in 11 on the 21st and 29th; in 10 on the 8th; in 9 on the 9th; in 8 on the 6th, 20th, 22d, 25th, and 26th; in 7 on the 31st; in 6 on the 3d and 18th; in 4 on the 2d, 19th, 24th, 27th, and 28th; in 3 on the 5th, 10th, and 12th; in 2 on the 1st, 11th, 13th, 16th, 17th, and 23d, and in 1 on the 15th. The 4th and 14th were the only dates on which no thunder-storms were reported.

East of the Rocky Mountains thunder-storms were reported on the greatest number of dates, 13, in Ky. and Tex.; on 12 in N. C. and Tenn.; on 11 in Fla.; on 10 in Ill., Miss., and Mo.; on 9 in S. C.; on 8 in Ala., Ark., and La.; on 7 in Ga. and Kans.; on 4 in Ind.; on 3 in Iowa, Mass., N. J., and Okla. T.; on 2 in Conn., Md., Minn., Nebr., N. H., Ohio, Pa., Va., and Wis.; and on 1 in Mich., N. Y., and W. Va. West of the Rocky Mountains thunder-storms were reported as follows: Ariz., 6th, 11th, 18th, 21st to 24th, 30th, and 31st; Cal., 1st, 5th, 15th, 16th, 22d, 26th, and 27th; Colo., 17th and 28th; Idaho, 25th, 26th, and 27th; N. Mex., 11th, 21st, 22d, and 23d; Utah, 22d, 27th, and 31st. In Del., D. C., Ind. T., Me., Mont., Nev., N. Dak., Oregon, R. I., S. Dak., Vt., Wash., and Wyo., no thunder-storms were reported.

MISCELLANEOUS PHENOMENA.

SUN SPOTS.

Mr. D. E. Hadden, Alta, Iowa: 1st, 1 group, 2 spots; group in faculae w. 3d, faculae disappearing by rotation on w. limb. 5th, 1 group, 1 spot; group e. limb by rotation. 6th, 2 groups, 3 spots; groups e. and se.; faculae e. and w. 8th, 1 group, 4 spots. 9th, 1 group, 6 spots; faculae e. 10th, 1 group, 6 or

8 spots; group n. latitude on meridian. 11th, 1 group, 4 spots. 12th, 1 group, 2 spots; prominent faculae by rotation on se. limb, followed by aurora in the evening; faculae near e. and w. limbs. 13th, 1 group, 1 spot; large spot by rotation, just in on e. limb; group which was nw. on 12th had vanished. 14th, 1 group, 1 spot; faculae by rotation se. limb. 15th, 1